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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,861	03/04/2002	Minoru Kawano	027260-517	4298

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EXAMINER

KNAUSS, SCOTT A

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 11/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/086,861

Applicant(s)

KAWANO ET AL.

Examiner

Scott A Knauss

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-23 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 6, 8, 9 and 13-17 is/are rejected.
- 7) ☒ Claim(s) 4, 7, 10-12, 18 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. The arguments set forth in the response filed 8/14/03 have been considered by the examiner. However, in light of the remarks below, the arguments are not persuasive, and therefore the action is made **FINAL**.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over DE 3617799 (Schmid).

Regarding claim 1 Schmid discloses an optical module in fig. 3, comprising:

An optical element #5

A supporting element #2 supporting the optical element

A first optical fiber #6 having a first end coupled to the optical element and a second end placed near to the supporting element

A second optical fiber spliced #8 to the first optical fiber.

Schmid does not, however, disclose the use of a fusion splice

Nevertheless, fusion splicing is well known in the art to connect two optical fibers together, and it would have been obvious to one of ordinary skill in the art to use known splicing methods to splice the two fibers of Schmid.

Regarding claim 2, the spliced portion #8 is supported by the supporting element

5. Claims 3,5,6,8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,680,493 (Naitoh).

Regarding claim 3 Naitoh discloses a module in figures 4 and 6 comprising:

An optical element (#25,#21,#22)

A supporting element #26 supporting the optical element

A first optical fiber #23A having a first end coupled to the optical element and a second end placed near to the supporting element

A second optical fiber #23 connected to the first optical fiber

Naitoh also discloses that the first optical fiber is connected with the second optical fiber by a ultraviolet ray setting resin (col. 1, lines 45-50), and the resin also being supported by the supporting element (see figs. 4 and 6). Naitoh does not, however, explicitly state whether a connected portion between the first and second fiber is covered by the resin.

Nevertheless, in order to securely connect the two fibers, it would be advantageous to place resin around the areas to be directly connected to each other in order to provide a strong, secure connection with high optical coupling, thus covering the connection with resin.

Therefore it would have been obvious to one of ordinary skill in the art to cover to connected portion between the two fibers with resin in order to align the two fibers with each other and to secure and strengthen the connection of the two fibers.

Regarding claim 5, Naitoh discloses a ferrule #24, which can be considered a sleeve, covering the resin

Regarding claim 6, the ferrule inherently has a through hole for the fibers to pass through

Regarding claim 8, the ferrule is transparent, through which ultraviolet rays are transmitted to harden the resin and thus unify the fibers.

Regarding claim 9, Naitoh discloses that the ferrule is made of quartz (col. 2, line 22), but fails to disclose a glass ferrule.

Nevertheless, glass ferrules are well known in the art, and it would have been an obvious design choice to one of ordinary skill in the art to substitute equivalent transparent ferrules into the module of Naitoh, since there is no stated criticality in the disclosure for a glass ferrule.

6. Claims 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naitoh in view of US 5,018,821 (Kurata).

Regarding claim 13, Naitoh, as modified above, discloses an optical module with all the limitations of claims 3 and 5, and discloses a fixing member (adhesion or soldering) which holds sleeve #24 on base #26 (see col. 3, lines 28-30 but does not disclose the use of a holding element fitted to a sleeve.

Kurata, on the other hand, discloses a similar method of connecting optical fibers in fig. 3, in which optical matching material is used to connect two fibers #11 and #15.

Kurata further discloses the use of a holding element #10 fitted to a sleeve body #13 for the purpose of effecting a connection between two fibers by the insertion of an optically matching material. Such a configuration is advantageous because it provides an easier method of inserting a matching material to connect two fibers. Although Kurata does not disclose the use of resin as a matching material, it is well known to use resins for such a purpose, as taught, for example, by Naitoh (see abstract), and thus would have been obvious to one of ordinary skill in the art to substitute known matching materials into the configuration of Kurata to effect a connection between two fibers.

Therefore it would have been obvious to one of ordinary skill in the art to substitute the optical connector ferrule of Kurata for the ferrule of Naitoh in order to facilitate a connection between two fibers using an optical matching material such as resin. Naitoh, as further modified by Kurata, would then have a holding element fitted to a sleeve, the sleeve being fixed to the base #26 of Naitoh

Regarding claim 14, Kurata discloses that a first fiber #11 is held by an adhesive #12a, which may be a thermosetting epoxy adhesive (see col. 4, lines 67-68), which can be considered to be a resin.

Regarding claim 15, Kurata discloses the use of a glass holding element #10 (col. 5, lines 21-22), but does not specify the use of a glass sleeve #13. Nevertheless, glass ferrules are well known in the art, and it would have been obvious to one of ordinary skill in the art to substitute known ferrules for the ferrule #13, in particular glass ferrules, in order to provide a hard ferrule to protect the fiber connection, thus providing a holding element and sleeve of the same substance.

Kurata discloses the use of a thermosetting resin #12b in a fitting space between the sleeve and the holding element, but does not specify a UV hardening resin. Nevertheless, it would have been obvious to one of ordinary skill in the art to substitute known resins for the resin #12b, in particular UV resins, in order to bond the holding element and sleeve together quickly and easily.

Regarding claim 16, Kurata discloses in fig. 3 the use of a slit (groove) #10a into which an optically matching material, in this case as modified above, resin would be packed into groove #12a

Regarding claim 17, Kurata discloses the holding element and first optical fiber being covered with resin, which would then be supported on the supporting element of Naitoh.

Allowable Subject Matter

7. Claims 4,7,10-12,18 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 4, as argued by the applicant, the prior art fails to suggest modifying the Schmid reference to use a resin element surrounding the fiber, and Naitoh teaches away from fusion splicing the two fibers.

Regarding claim 7, there is no teaching or suggestion to place a through hole almost on the center of the sleeve of Naitoh.

Regarding claims 10-12, the prior art fails to teach or suggest modifying the module of Naitoh by attaching a resilient (i.e. flexible) hood to the module, which covers the sleeve, and then having the second optical fiber protrude from the hood.

Regarding claims 18 and 19, the prior art fails to teach or suggest modifying the module of Naitoh to have a package to seal the optical element, wherein the package has a protrusive portion on the *outside* of the package which holds the *first* fiber (i.e. the fiber closest to the optical element).

Claims 20-23 are allowed.

Regarding claim 20 in particular, as argued by the applicant, the prior art fails to teach or suggest further modifying the device of Schmid by inserting the fusion spliced portion into a sleeve and packing resin into the sleeve.

Remarks

8. The applicant has traversed the examiner's original rejection of claim 1 arguing that there is no motivation to modify the Schmid reference to use fusion splicing to connect the two fibers, arguing that:

- a) using a fusion splicing method would alter the distributions of refractive index at the splice from the intended distributions and alter the intended relationship of diameters
- b) it would be difficult to securely hold a fiber for cutting at the position of splice #8
- c) it would be difficult to hold the fibers being spliced securely given the configuration of Schmid.

The examiner disagrees. In response to the applicant's arguments, the examiner cites (but does not rely upon) US 2002/0005989 (Bhagavatula) to show that such a fusion splice is indeed known in the art. Applicant's attention is directed to figs. 13 and 14, where a GRIN fiber #184 is fusion spliced to a single mode fiber #186. It is apparent from the figures that the refractive index profiles and diameters are not significantly disturbed by this splicing. Furthermore, the examiner disagrees with the argument that it would be extremely difficult to splice the two fibers in Schmid, since one of ordinary skill in the art would splice the two fibers before placing them on the substrate, and Schmid does not specifically teach that such a splice is formed while the fibers are on the substrate.

The applicant has additionally traversed the examiners rejection of claim 3 over Naitoh, arguing that the rejection does not specify what modification would be made to

the Naitoh device. However, the point of the examiner's rejection was that, while it is not explicitly specified in Naitoh that the connected portions of each fiber are covered, in order to permanently connect the end portions of each fiber together, it would have been obvious to one of ordinary skill in the art to place the resin material on one or both of the end portions of each fiber so that the end faces of the fibers can be connected together, thus serving to "cover" the end portions (connected portions) of the fiber and thus fix them together.

Regarding applicants traversal of the examiner statement that is well known to use any type of resin to serve as a matching material, the examiner notes in response that it would have been obvious to one of ordinary skill in the art to select any type of resin *suitable as a matching material*, such as the resin disclosed by Naitoh, which was cited in the rejection based on Kurata.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A Knauss whose telephone number is (703) 305-5043. The examiner can normally be reached on 9-6 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (703) 308 - 4819. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Scott Knauss

Art Unit 2874

sak
October 21, 2003


HEMANG SANGHAVI
PRIMARY EXAMINER